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Approved For Release 2003/01/28 : CIA-RDP78B04770A002600010016-7



25X1

PAR 216


29 Feb 64

SUBJECT: Exposure of Photographic Materials with Lasers

TASK/PROBLEM

Determine the manner and degree of the interaction of present and predictable future photographic films with coherent radiation from laser sources in the red and near IR spectrum ranges.

DISCUSSION

Informal authorization was given to proceed on this project during the 3 - 4 Feb conference held at the contractor's facility and was confirmed by message 0885, 10 Feb 64. The effort has been assigned to a group actively engaged in laser research and development. Assistance in photo technology, where required, will be coordinated by  of the PITA group.

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Collection of equipment and materials required to proceed with the program is nearing completion.

PLANNED ACTIVITIES

Exploration of the "sensitometry" problems such as effective speed, contrast, etc. is expected to start during the first week of March.

Declass Review by
NIMA/DOD

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6 Dec 63

STUDY PROGRAM OBJECTIVE

Exposure of Photographic Materials with Lasers (PAR #216)Problem

In a request by the customer several areas of needed information under this general topic were indicated and a statement of the desire to promote interest and thinking on related problems not yet defined or recognized was expressed. This statement of project goals is in response to that request.

Information is already available on some of the subjects of interest. A preliminary report on these items will be prepared as soon as authorization for this project is received.

Proposal

A. Studies and measurements are proposed leading to an understanding of the interaction of sensitized products with laser produced radiation, such as:

1. Image quality and sensitometry will be measured for films of suitable color sensitivity as exposed to the He-Ne laser (6328A) and to other lasers in the visible or near IR region which appear useful. Examples of the films to be measured are -

- (a) SO-243 - Kodak Special High Definition Aerial Film (Gray Base)
- (b) Type 4404 - Kodak High Definition Aerial Film (Estar Thin Base)
- (c) Type 8401 - Kodak Plus-X Aerecon
- (d) Type 8403 - Kodak Tri-X Aerecon

These materials are all panchromatic with extended red sensitivity with various supports and basic emulsion speed. Others may be added as the studies proceed.

2. Interference phenomena, destruction of coherence and other physical effects upon image formation will be explored for a variety of sensitized material components and component combinations. For example, comparative tests of -

- (a) Gray Base vs clear support,
- (b) Pelloid coated vs uncoated,
- (c) Acetate vs polyester support, etc, should be made and studied.

Consideration of films as receptors and as original image material will be included in these studies.

B. Optimization of the Laser

We propose to explore the production of 0.5 micron (blue-green) laser radiation already demonstrated [redacted]

[redacted] and other laboratories by harmonic doubling in KDP and ADP

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crystals. There are many factors to encourage the use of radiation in the 5000A to 6000A region in photographic systems such as -

- (a) Availability of a wide range of existing sensitized products for which much performance data is already available.
- (b) Existing optical system designs corrected for this wavelength range.
- (c) The possibility of using sensitized materials which may be handled under safelights.

25X1 [] is doing research on "doped" borate glasses which provide high energy output at about 1 micron wavelength. The application of these materials with a frequency doubling element will be studied under this contract along the lines indicated under "A" for red light and near IR lasers. In this study it may be useful to measure reciprocity effects for the very short exposures possible with solid lasers.

C. Effects of Heat

In the type applications of the laser which occur to us as being of potential value in photographic systems the energy level of the radiation reaching the sensitized material is comparable to that obtained with conventional sources. In this situation there is no reason to expect a difference in behaviour of the support with regard to dimensional stability, deterioration with age, etc.

Applications in which the radiation level is much higher must, of course, be considered for their own set of problems.

D. Photographic Processing

We do not expect to find a need for revision of processing procedures beyond the possible need for minor adjustment of contrast. The need for different procedures would be indicated by the measurements of product sensitometry described under A. 1. Should the need for such revisions be indicated they will be included in this project.

E. Potential New Sensitized Materials

It has been the policy of [] to provide sensitized materials within the capability of the art (and in many cases to extend the art) to satisfy special requirements of importance to government and industry. However, the company does not accept contracts to develop sensitized products.

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26 January 1967

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[REDACTED] - ACTIVE PAR TITLES AND PROPOSED CONDENSED TITLES

<u>PAR</u>	<u>Title</u>	<u>Proposed Condensed Title*</u>
202	Briefing Print Enlarger	Same as title.
203	Rapid Access Printer	Same as title.
206	Reversal Processing of High-Resolution Films Study	Reversal Processing Study
207	Definitive Study of Contact Printers	Contact Printer Study
211	Microdensitometer Study of Effects of Processing	Image Effects Study
212	Color Acquisition System Review Study	Color Acquisition Study
213	Color Reproduction Systems Review	Color Duplication Study
214	Roller Transport Reversal Processor (12-Inch)	Reversal Processor RT-12
215	Roller Transport Processor (24-Inch)	Processor RT-24
216	Exposure of Photographic Material with Lasers	Laser Photographic Exposure ✓
217	Optimization of Lasers	Same as title.
222	Stereo Registration Systems	Stereo Registration System
223	Monochromatic Lens System	Monochromatic Lenses
224	3X - 15X Fluid Gate Enlarger	Fluid Gate Enlarger
225	Microdensitometer Training Program	Microdensitometer Training
	[REDACTED]	[REDACTED]

*Condensed titles are to contain a maximum of 30 characters including spaces.

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30 Oct 64

FISCAL SUMMARY -
(Includes G&A and Fee)

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PAR	Title
201	Travel & Liaison
202	Briefing Print Enlarger
203	Rapid Access Printer
204	Contact Chip Printer
205	Precision 4X Enlarger
206	Rev. Processing of DN's
207	Study Contact Printer
208	Non-Elec Image Enhancement
209	Phosphor Viewer
210	Laminated Slides
211	Edge Effect Study
212	Color Acq. Study
213	Color Dupe Study
214	RT-12-R
215	RT-24
216	Lasers w/Photo Mat'l
217	Optimization of Lasers
218	Autofocus Systems
219	Opt. vs Contact Ptg 1:1
220	Static Elec Hold-Down
221	Lens Bench Manual

Remarks

Phase I Only

Term. Rpt. Est comp 20 Dec 64

Term. Rpt. Est comp 20 Dec 64

Cancelled 15 Apr 64

Cancelled 3 Aug 64

Completed 4 Sept 64

Est of cost to completion being prepared.

Est of cost to completion being prepared

PAR not sub/msg 8204

PAR not sub/msg 8204

Disapproved/cust msg 2688, 3 Aug 64

PAR not sub/msg 8204

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